

DEVELOPMENT OF IMPROVED PROCEDURES FOR MANAGING PAVEMENT MARKINGS DURING FDOT HIGHWAY CONSTRUCTION PROJECTS

PROBLEM STATEMENT

Highway construction frequently involves modification to the existing pavement markings. Maintenance of traffic plans typically consist of numerous phases, each requiring different routing of the traffic through the work zone. Existing thermoplastic markings must be removed and replaced with temporary markings that indicate the new lanes. Temporary markings must also be removed and replaced as different maintenance of traffic phases are implemented.

Current Florida Department of Transportation (FDOT) specifications do not allow the use of paint to cover or mark out existing pavement markings. Mechanical removals of the existing markings by water blasting or by grinding are the methods most often used for marking removal. However, both methods are relatively expensive and frequently do not produce satisfactory results. Mechanical removal frequently results in pavement scarring, which can be a serious problem. The pavement scars can easily be mistaken for pavement markings with wet pavement conditions at night or with the sun at the right angle to the pavement.

Work zone safety is a key concern. Safely navigating through a highway construction work zone places extraordinary demands upon the motorist. Construction activities and lighting can be distracting when the motorist must negotiate temporary lane shifts and/or detours. Clearly, it is essential that the motorist not be confused or distracted by pavement markings that have not been properly removed.

Emergency closures on major roadways, such as interstate highways, present additional challenges. Pavement markings must be removed quickly and effectively. The current mechanical removal methods are not satisfactory for emergency situations.

OBJECTIVES

The overall goal of this research is to study the removal of pavement markings and to develop improved methods for removing temporary markings. The method must remove all traces of the markings and leave no pavement scarring that might be misleading to the motorist.

FINDINGS AND CONCLUSIONS

The approach adopted by the research team was to investigate the feasibility of covering pavement markings rather than attempting to remove them from the pavement surface. The research team first studied the application of the seal coating method for the removal of pavement markings and then developed an appropriate method. This study applied

manufacturer's seal coat materials to cover pavement markings according to their specification. The friction evaluation plan was developed and performed after seal coat applications. FDOT's Pavement Friction unit (Locked-Wheel Skid Trailer) and the British Pendulum Tester were used for the seal-coated surface friction tests. Field tests were performed to evaluate friction performance and constructability.



Figure 1 Photograph of Modified Sand Seal Installation

The second approach involved the development of a modified sand seal coating. In this method, a traditional sand seal application was modified by increasing the asphalt temperature and by utilizing concrete fine aggregate. The increased temperature shortened the break time for the asphalt, and the angular sand improved the friction properties. A test section was installed on a construction project. Locked-Wheel friction tests were performed to measure friction performance. The covering suitability and durability of the covering were observed.

In addition, this research also investigated to feasibility of using removable marking tapes for the removal of pavement markings. 3M Removable Black Line Mask and ATM Black-Out Tape were installed at project test site and their performance was evaluated.

The seal coating method adequately covered the pavement markings and obtained satisfactory friction test results. However, the main drawback was that several hours of set time was required before traffic could be allowed on the treated pavement. Additionally, the coal tar based seal coating material is not organic to typical asphalt paving projects.

The modified sand seal coating provided exceptional performance with regard to friction, coverage, and durability. The materials and equipment required for installation are normally found on paving projects. Cost estimates indicate that the modified sand seal coating can be

installed at less cost than the use of the current water blasting and grinding removal methods. Figure 1 provides a photograph of the modified sand seal installation.



Figure 2 Photograph of Covering Tape Installation

The covering tapes performed satisfactorily with regard to coverage and durability, but, with regard to color, would only match the color of new asphalt and would not be appropriate for weathered asphalt pavement. Figure 2 provides a photograph of the covering tape installation.

BENEFITS

The sand seal covering proved to be a practical and successful method for covering temporary pavement markings. The sand seal covering method offers the following advantages:

- no scarring of the pavement
- markings are completely covered and will not be mistaken as marks
- materials and equipment required are already organic to most roadway projects
- does not require the mobilization of specialized equipment
- installation requires only 30 to 40 minutes of lane closure
- covering is durable
- asphalt paving may be placed directly over the covering
- sand Seal Covering is less costly than current grinding or blasting methods

The covering tapes also proved to be successful. Both tape products covered the markings and were not noticeable to the motorist in dry or in wet conditions. The tape covering offers the following advantages:

- no scarring of the pavement
- markings are completely covered and will not be mistaken as marks
- does not require the mobilization of specialized equipment
- covering is durable
- no set or mobilization time required
- tape may be removed and the markings reused
- cost appears to be competitive with current methods and is likely to be very cost effective for small quantity applications

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